

REMARKS

Claims 1, 3-12, 14-23, 26, 29-31 and 33 are in this application and are presented for consideration. By this amendment, Applicant has amended claims 1, 3-12, 14-23, 26, 29-31 and 33. Claims 2, 13, 24, 25, 27, 28 and 32 have been canceled.

The abstract has been objected to because it contains legal phrascology and more than 150 words.

Applicant has amended the abstract as shown above such that the abstract is less than 150 words and contains no legal phrascology.

Claims 2, 13, 25, 28 and 32 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out and distinctly claiming the subject matter which the Applicant regards as the invention.

Claims 2, 13, 25, 28 and 32 have been canceled.

Claims 1-25 and 31-33 have been objected to because of minor informalities.

Applicant has amended the claims paying close attention to the Examiner's remarks. It is Applicant's position that the excitation signal has proper antecedent basis in claims 31 and 33. Further, the functional language of the final paragraphs of claims 31 and 33 is supported by the specification. The specification provides that an image is generated based on the echographic signal. One of ordinary skill in the art would understand that such the signals generated from the microbubbles can be processed to produce an image as claimed in claims 31 and 33. Accordingly, Applicant respectfully requests that the Examiner remove the objections to the claims.

Claims 1-30 have been rejected under 35 U.S.C. 101 because the Office Action states that the claimed invention is directed to non-statutory subject matter.

As the Supreme Court has held, the Congress chose the expansive language of 35 U.S.C. 101 so as to include “anything under the sun that is made by man.” 35 U.S.C. 101 provides four categories of inventions that are deemed patentable subject matter: processes, machines, manufactures and compositions of matter. The latter three categories define “things” while the first category defines “actions,” i.e. a series of steps or actions to be performed. 35 U.S.C. 100 states that the term process means “process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.” Furthermore, 35 U.S.C. 101 requires that the subject matter sought to be patented be a “useful” invention. The subject matter the courts have found to be outside the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena. In practical terms, claims define nonstatutory processes if they consist solely of mathematical operations without some claimed practical application. (MPEP 2106).

Claims to computer-related inventions that are clearly nonstatutory fall into the same general categories as nonstatutory claims in other arts, namely natural phenomena such as magnetism, and abstract laws of nature, which constitute “descriptive material.” Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” Functional descriptive material consists of data structures and computer programs which impart functionality when employed as a computer component whereas nonfunctional descriptive material includes music, literary works and a compilation of data.

Both types of “descriptive material” are nonstatutory when claimed as descriptive material *per se*. When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of the technology permits the function of the descriptive material to be realized. However, nonfunctional descriptive material may be claimed in combination with other functional descriptive multi-media material on a computer-readable medium to provide the necessary functional and structural interrelationship to satisfy the requirements of 35 U.S.C. 101. (MPEP 2106).

To be statutory, a claimed computer-related process must either: (1) result in a physical transformation outside the computer for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan; or (2) be limited to a practical application within the technological arts. Similar to a machine claim, a computer-related process is statutory subject matter when the process, as claimed, produces a concrete, tangible and useful result, i.e. the method recites a step or act of producing something that is a concrete, tangible and useful result. An example of such statutory subject matter is a claimed process for digitally filtering noise using a mathematical algorithm. Furthermore, a process found to be statutory subject matter was a digital filtering process for removing noise from a digital signal comprising the steps of calculating a mathematical algorithm to produce a correction signal and subtracting the correction signal from the digital signal to remove the noise. (MPEP 2106).

The limitations as recited in claims relate to a computer-related process since the digital

signal that results from the process is used to generate images. The signal that results from the steps as recited in the claims produces a concrete, tangible and useful result in that the signal is processed to create an image that is particularly useful in analyzing various parts of a patient's body. Applicant fails to see how the process as recited in the claims is any different than the statutory subject matter of a digital filtering process for removing noise from a digital signal that uses a mathematical algorithm to produce a correction signal. Both create a signal that produces a useful result. In the case of the digital filtering process, the useful result is a correction signal to reduce noise and in the present invention the process in the claims leads to the useful result of a signal that can be further processed, such as using the signal to create an image. Furthermore, the process as recited in the claims is described by "functional descriptive material", specifically a signal, that is structurally and functionally interrelated to a computer-readable medium since a computing unit is able to further process the signal.

The present invention is more than just an academic exercise. The present invention transforms the signals to generate an image. Applicant discovered that an excitation signal that exerts a pressure of 60 to 200 kPa allows the microbubbles to emit a stable signal. This advantageously provides for a better image of the part being analyzed. As such, the present invention provides a useful and tangible result. Accordingly, Applicant respectfully requests that the Examiner favorably consider the claims as now presented.

Claims 1-33 have been rejected under 35 U.S.C. 102(b) as being anticipated by Brock-Fisher et al. (U.S. 6,638,228 B1).

The present invention relates to an ultrasonic imaging method and a device for imaging

the harmonic response of a structure inside the body of a patient. The invention is based on the discovery that it is possible to use subharmonics to perform imaging (i.e. to generate echographic images) when an acoustic pressure generated by an excitation is within a stability range. The stability range is a pressure range within which the subharmonics are stable, i.e. the echo signal generated by the microbubbles has a sufficient duration as to generate a significant radiofrequency signal. Applicant has discovered that optimal stability is provided in the pressure range between 60 and 200 kPa. The prior art as a whole fails to disclose such features or such stable signal advantages.

Brock-Fisher et al. fails to teach and fails to suggest the combination of an excitation signal that exerts a pressure of 60 kPa to 200 kPa on microbubbles in a echographic contrast medium. Brock-Fisher et al. discloses contrast-agent enhanced color-flow imaging, which has a mechanical index from 0.05 to 0.5. Brock-Fisher et al. defines the mechanical index as a United States Food and Drug Administration regulated parameter defined as peak-rarefactional pressure in mega-Pascal divided by the square root of a center frequency in megahertz. However, an excitation signal does not exert a pressure in a range of 60 to 200 kPa on the contrast-agent of Brock-Fisher et al. Compared with Brock-Fisher et al., the excitation signal of the present invention exerts a pressure in a range of 60 to 200 kPa on microbubbles of an echographic contrast medium. This advantageously allows the signals generated by the microbubbles to provide a stable signal at at least one subharmonic of an excitation frequency. In contrast to the present invention, Brock-Fisher et al. does not teach or suggest a specific pressure range for the purpose of performing imaging using subharmonics, which enable a

stable subharmonic imaging to be achieved. In fact, Brock-Fisher et al. is void of any teaching or suggestion for delivering an ultrasonic excitation signal at an excitation frequency to a part at a frequency of 3.3 MHz. The contrast-agent of Brock-Fisher et al. is not subjected to an excitation frequency of 3.3 MHz. As such, the prior art as a whole takes a completely different approach and fails to teach or suggest important features of the claimed combination. Accordingly, Applicant respectfully requests that the Examiner favorably consider claims 1, 8, 10, 22, 23, 26, 29, 30, 31 and 33 as now presented and all claims that respectively depend thereon.

Favorable consideration on the merits is requested.

Respectfully submitted
for Applicant,



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Attached: Petition for Two Month Extension of Time

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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE
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